OsteoArthritis and Cartilage (2004) **12,** 366–373

doi:10.1016/j.joca.2004.01.005

Osteoarthritis and Cartilage

International Cartilage Repair Society

OARSI OSTEOARTHRITIS RESEARCH SOCIETY INTERNATIONAL

Disability induced by hand osteoarthritis: are patients with more symptoms at digits 2–5 interphalangeal joints different from those with more symptoms at the base of the thumb?

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Summary

Background: The contribution of osteoarthritis (OA) at the base of the thumb (BT) and digits 2–5 interphalangeal joints (IP) to disability in the hand has never been assessed.

Objectives: To evaluate and compare disability in patients with clinical hand OA and more severe symptoms at BT or IP.

Design: Observational, prospective, correlational.

Setting: Rheumatology and rehabilitation departments in two tertiary care teaching hospitals.

Participants: One hundred and sixteen patients (107 women, mean age 62±7 years) fulfilling the American College of Rheumatology criteria for OA in the hand, with more symptomatic BT (67 patients) or IP (49 patients).

Main outcome measure: Disability assessment with Cochin hand functional scale (CHFS) was the primary outcome. Assessment of impairment by the visual analog scale of pain (VAS pain), Ritchie articular index (RAI), modified Kapandji index (mKI), Kallman radiological classification and handicap assessment with visual analog scale (VAS Hd) was the secondary outcome. Group comparisons were assessed by use of Student's *t*-test for quantitative variables and Chi-square test for categorical variables. Results of the CHFS analysis were assessed by factorial analysis followed by Varimax rotation. Correlation between scores of disability, impairment, and handicap measures were calculated with use of Spearman rank correlation coefficient.

Results: Demographic data, disease duration, and level of global pain were similar between the BT and IP groups. The BT and IP groups did not differ significantly according to disability and handicap level (P=0.42 and P=0.94 for CHFS total score and VAS Hd, respectively). Factor analysis of the CHFS revealed similar results for the two groups of patients, especially for the first extracted factor. Disability scores correlated best with global hand pain (r=0.65) in the BT group and with RAI scores (r=0.71) in the IP group.

Conclusions: Disability and perceived handicap levels are comparable in clinical hand OA patients with more symptomatic BT or IP. These two groups should not be considered different during trials assessing treatments for hand OA when the primary outcome measure assesses disability.

Key words: Osteoarthritis, Hand, Disability, Outcome measures, Handicap.

Introduction

The prevalence of digital osteoarthritis (OA) varies according to whether a radiological or clinical definition is adopted. Radiologically defined OA of the hand has been estimated to represent 38% of women and 24.5% of men over 66 years of age[1] but higher prevalence of 60–70% has also been reported[2]. Of patients with radiological signs, 20% to 40% become symptomatic[3,4]. Clinical symptoms and level of functional disability are not correlated with radiological findings[5]. For patients over 55 years of age, the distal interphalangeal joints are the most prevalent site of OA (20%) determined radiologically and clinically, followed by the base of the thumb (BT) (8%) and proximal interphalangeal joints (IP) (5%). This prevalence increases

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Received 3 February 2003; revision accepted 13 January 2004.

with age, and the incidence peaks in perimenopausal women[6–11].

Osteoarthritis in digits 2–5 interphalangeal joint (IPOA) concerns distal interphalangeal and proximal interphalangeal joints. IPOA could cause limitations in the range of motion and flexion and lateral deviations. Its contribution to disability in hand function is not well known. Osteoarthritis in the base of the thumb (BTOA) concerns the trapezometacarpal joint, with a possible secondary location at the trapezotrapezoidial and scaphotrapezial joints. BTOA induces a closure of the first web, which in turn causes an alteration of the thumb-index pinch and therefore a limitation in hand function[12]. Pain induced by the compression of the thumb column during pinching could also lead to functional disability. The functional consequences of BTOA and IPOA have not been specifically evaluated and compared. The respective contributions of BTOA and IPOA to hand disability have never been assessed.

Although OA is often thought to contribute minutely to overall disability in the hand, the handicap induced by limitations in performing activities of daily living may be considerable[3]. Using the same measurement tool, it has been shown that disability caused by hand OA could reach the same levels as the one induced by rheumatoid arthritis (RA)[5,13,14].

The present study seeks to characterize and compare the functional disability of clinical hand OA patients with more symptomatic BT or IP in order to determine whether these two groups should be analyzed separately in clinical trials.

Materials and methods

PATIENTS

Eligibility criteria

To be eligible for the study, the patients had to fulfil the American College of Rheumatology criteria of OA in the hand[15] and being between the ages of 40 and 75 years. Patients were excluded on the basis of: (1) severe psychiatric disorders (particularly psychosis and depression requiring a change in treatment in the last 90 days); (2) restricted hand motion due to skin lesions or Dupuytren's contracture or collagen disease; (3) neurological disorders of the upper limbs; (4) upper limb arthroplasty, amputation or joint fusion; hand and wrist surgery or trauma within 90 days of entry into the study; (5) inability to speak French fluently or cognitive troubles; (6) absence of hand X-ray in the last 3 months; (7) secondary OA (post-traumatic, inflammatory rheumatic disease, metabolic rheumatic disease, concomitant inflammatory rheumatic disease); and (8) pathologic wrist or hand tendon characteristics or rupture.

Recruitment

Outpatients and inpatients were prospectively and consecutively recruited from Physical Medicine and Rehabilitation and Rheumatology departments. Recruited outpatients were mainly referred for hand OA, whereas inpatients were hospitalized for other reasons. Patients were sent to the principal investigator in one of the two centers where eligibility criteria were assessed. Written consent was obtained from each participant.

Group assignment

Patients were assigned to the BT group or the IP group depending on the more severe localization of pain and the perceived disability. Patients were asked to choose between BT and IP joints for the more severe pain and perceived disability (defined as the more bothersome location for activities of daily living). Patients with more severe pain and perceived disability caused by OA of the base of the thumb were assigned to the BT group. Patients with more severe pain and perceived disability caused by OA of the interphalangeal joints were assigned to the IP group. Patients with the most severe pain and perceived disability in different locations (more severe pain in IP joints and more severe perceived disability caused by OA of the BT or more severe pain at the BT and more severe perceived disability caused by OA of the IP joints) were excluded from analysis.

STUDY DESIGN

The transversal observational study was held between January and December 2001. Evaluation was not blinded. All subjects were referred to one physician who collected questionnaire data and results of the clinical examination during the same consultation (1 h).

DATA

Outcomes

The assessment of disability was the primary outcome. Impairment and handicap assessments were secondary outcomes.

Outcome measures and description

The following parameters were recorded: demographic and disease characteristics, hand disability measures, impairment measures and patient's perceived handicap.

Hand disability measures.

Cochin hand functional scale

This heteroquestionnaire with a mean length of 3 min consists of 18 questions concerning difficulty in performing certain daily living activities group under five items (kitchen duties, dressing, toiletry, deskwork and others) in the past month, each question scoring from 0 (performed with difficulty) to 5 (impossible to do). The total score is obtained by adding the scores of all questions (range 0–90). The test has been shown to be reliable (interobserver reliability 0.96), precise and sensitive to change in hand OA and RA[5,9,16,17].

Impairment measures.

Perception of pain level

The perception of pain intensity associated with BTOA and IPOA was estimated by use of a horizontal VAS, after a question was read orally by the evaluator[18]. The scale ranges from 0 mm (no pain) to 100 mm (maximally imaginable pain). As recommended by some authors, pain perception was evaluated for its intensity during the 48 h before evaluation[19,20]. Global pain, pain at the base of the thumb and interphalangeal pain in other digits were recorded for each hand.

Ritchie articular index

The total score of tenderness, as measured by the Ritchie articular index, was recorded[21]. As described by

Ritchie, joints examined with direct vertical manual palpation are the carpometacarpal, including the scaphotrapezial and trapezometacarpal joints. All other joints were examined with lateral manual pressure: metacarpophalangeal joint of the thumb, interphalangeal joint of the thumb, proximal interphalangeal joints and distal interphalangeal joints of the fingers in both hands. The score for each joint ranged between 0 (absence of pain) and 3 (pain associated with withdrawal movement) (range 0–72) for both hands).

Modified Kapandji index

A modified Kapandji index was obtained by summing the scores of three tests: the first test assesses thumb opposition for each hand (range 0–10)[22]; the second assesses flexion of digits 2–5 and scores from 0 (impossible to do) to 5 for each hand (range 0–20)[23]; and the third assesses finger extension for each of the second to fifth digits (range 0–5) for each hand, with total range for each hand between 0 and 20[23]. The index has recently been validated in RA[24]. A minimal score indicates possible to do and a maximal score indicates a normal mobility with completely accomplished movement.

Pinch and grip strength

The thumb index pinch and grip strength of each hand were assessed with the use of an electronic dynamometer (Amplifier HDM, Société Biometrics France, Parc Club Orsay Université, 91893 Orsay Cedex, France), according to standardized methodology and expressed in Newtons[20,25]. Pinch strength and grip peak force values were tested three times for each hand and alternating hands for each test. Patients were given a 1-min rest period between each test. The highest value for each hand was recorded.

Patient's perceived handicap

A visual analog scale was used to evaluate patients' perceived handicap (VAS Hd)[13,26]. Handicap was explained to each patient as being the disadvantage induced by OA of the hand in activities of daily life. The VAS Hd was estimated in patients only after the interviewer was sure the concept of handicap was thoroughly understood. The scale ranges from 0 mm (no handicap) to 100 mm (maximally imaginable handicap).

RADIOGRAPHICAL ANALYSIS

The Kallman classification for radiological score of hand OA was used[27,28]. It assesses the presence and degree of osteophytes (score range 0 to 3), joint space narrowing (score range 0 to 3, with the exception for the scaphotrapezial and interphalangeal joints for which the maximal score is 2), bone sclerosis (score 0 or 1), subchondral cysts (score 0 or 1), articular deformity (score 0 to 1) and articular erosion (score 0 to 1). The following joints are assessed: scaphotrapazial, trapezometacarpal, metacarpophalangeal and interphalangeal joint of the thumb, and proximal and distal interphalangeal joints of second to fifth digits in both hands. Three scores were obtained for each hand: score for thumb, score for proximal and distal interphalangeal joints, and total score (range 0–220).

STATISTICS

Number of subjects

The sample size was calculated according to the standard deviation observed in a study on sensitivity to change of the CHFS in hand OA[5]. In this study, the standard deviation was 9 for a difference of 2.4. There was no other study of reference to determine the necessary sample size for the current study. If a clinical pertinence of a difference of 10 points for a total of 90 between BT and IP groups on the CHFS was retained, on the basis of a standard deviation slightly overestimated of 12, taking as alpha risk 0.05 and power (1-β) 0.80, in the bilateral situation, the number of subjects necessary in each group was 46.

STATISTICAL ANALYSIS

Statistical analysis was carried out only once, at the end of the study. Before any statistical analysis, demographic and clinical characteristics of BT and IP groups were compared with the use of the unpaired Student's *t*-test for quantitative variables and Chi-square test for categorical variables. The primary outcome was tested with the use of the Student's *t*-test to detect any statistical difference between the mean total scores in the BT group and the IP group on the CHFS. Statistical significance level of 0.05 was retained for this and all other statistical tests.

In each group, correlation between disability, and impairment and handicap was tested with rank sum correlation coefficient (Spearman rank correlation coefficient) because normal distribution was not possible to ascertain. To analyze further the type of disability observed in both groups, a factorial structure of the CHFS was evaluated in the whole group as well as in both populations by factorial analysis followed by Varimax rotation in both groups. The SYSTAT 9 Delta Soft® program for Windows NT/97/98 was used for the analyses.

Results

PATIENTS' CHARACTERISTICS

A total of 171 patients were referred to the investigator and 116 patients, 67 in the BT group and 49 in the IP group, were included in the study over an 11-month period. Fifty-five patients were excluded because of crystal-induced arthropathy diagnosed on X-ray (*N*=14), carpal tunnel syndrome with motor deficit (*N*=6), previous hand surgery with functional sequellas (*N*=4), mood disorders with recent change of medication (*N*=2), communication barrier (*N*=1), C6 radiculopathic features (*N*=1), hemocromatosis (*N*=1), bone cyst (*N*=1), or other medical conditions (*N*=1; urgent hospitalization for abdominal aneurysm). Fourteen patients who were eligible refused to participate; seven accepted but did not come to the interview. Finally, three patients with the most severe pain and perceived disability in different locations (IP and BT) were excluded from analysis.

The 22 inpatients did not differ from outpatients in terms of age, gender, levels of pain, disability and handicap (data not shown).

Table I reveals no significant difference between BT and IP patients in age and gender and proportion of right-handed and heavy manual workers. As well, among women, age at menarche, menopause duration, frequency and duration of hormonal substitution did not differ between the two groups.

Disease duration and treatments received did not differ between the two groups, except for use of non-steroidal antiinflammatory drugs and ortheses, which were more often used in the BT group (*P*=0.02 and 0.01, respectively) (Table II).

Table I
*Demographic characteristics of the population**

	Whole group of patients (*N*=116)	BT group (*N*=67)	IP group (*N*=49)	BT vs IP *P* value Student's *t*-test or Chi^2
Age (mean±SD)	62.11±7.36	62.71±7.89	61.29±6.55	0.29
Gender (female,%)	92.24	91.04	93.87	0.57
Right handed (%)	95.69	98.50	91.83	0.08
Retired (%)	65.51	68.65	61.22	0.40
Manual work (%)				
Heavy	26.72	31.34	20.40	
Moderate	39.65	41.79	36.73	0.17
Light	33.62	26.86	42.85	
Age at menarche (mean±SD) (*N*=107)	12.76±1.43	12.54±1.24	13.06±1.62	0.07
Menopause (%)	93.46	93.44	93.47	0.87
Menopause duration (years) (mean±SD)	12.83±7.48	13.23±7.62	12.50±7.21	0.62
Pregnancy (mean±SD)	1.73±1.05	1.57±0.96	1.95±1.14	0.09
Hormonal substitution (%)	73.33	73.33	73.33	1.00
Hormonal substitution duration (years) (mean±SD)	10.85±6.74	11.53±7.12	10.11±6.05	0.35

*Abbreviations: BT: base of the thumb; IP: interphalangeal joint; SD: standard deviation.

ASSESSMENT OF DISABILITY, IMPAIRMENT AND HANDICAP

Disability assessment

Level of disability, as measured according to the CHFS total score, did not differ between the BT and IP groups (16.84±12.60 and 14.80±14.13, respectively, *P*=0.42) (Table II).

Impairment assessment

Global pain in each hand assessed according to the VAS did not differ significantly between the groups (35.94±29.77 and 34.49±27.36 for the right hand and 29.54±28.37 and 34.19±25.91 for the left hand in BT and IP, respectively). As expected, pain at the base of the thumb was significantly higher for both hands in the BT group, whereas pain in the interphalangeal joint was significantly higher in the IP group (Table II).

Three impairment outcome measures were significantly different in both groups. Total score of tenderness as measured by the Ritchie articular index was higher in the IP group (11.59±8.71 and 8.61±6.57 for IPOA and BTOA, respectively, *P*=0.05). Global hand mobility, as assessed by the Kapandji index, was lower in the IP group than in the BT group (89.59±12.30 and 98.55±7.13, respectively, *P*=0.001). Kallman's radiological index score was significantly higher in the IP group than the BT group (67.47±36.76 and 37.67±23.52 for the total scores in IP and BT, respectively, *P*=0.001).

Finally, grip and pinch strength did not differ significantly between groups (Table II).

Handicap assessment

Patients' perceived handicap, as assessed on the VAS, did not differ between the two groups (38.66±29.95 and 38.24±29.60 in the BT and IP, respectively, *P*=0.94) (Table II).

FURTHER ANALYSES OF DISABILITY

Factor analysis

Factor analysis of the CHFS in the whole group and in the two subgroups extracted three main factors with eigenvalues ≥1, explaining 65.36%, 63.52%, and 71.17% of the variance for the whole group, the BT group, and the IP group, respectively (Table III). Results of factor analysis and Varimax rotation were similar between the two groups. Factor 1 in the BT and IP groups were comparable, with six of eight (BT) and six out of seven (IP) questions being shared (questions 1, 2, 3, 4, 5, 8). Moreover, factor 2 for the BT group corresponded to factor 3 for the IP group, with three of five (BT) and three of four (IP) questions being shared (questions 9, 10, 11).

To underline differences in disability between BT and IP groups, scores of the three factors (F1, F2, F3) obtained after factor analysis in the whole group of patients were compared (Table IV). No difference was observed between the groups for F1 and F3 scores (2.48±3.15 and 3.18±3.89, for F1 in BT and IP, respectively, *P*=0.30, and 5.31±4.59 and 5.39±5.28 for F3 in BT and IP, respectively, *P*=0.94). For F2, scores in the BT group were significantly higher than those of the IP group (9.04±6.13 and 6.22±6.09 in BT and IP, respectively, *P*=0.02).

Correlation between disability and other outcome measures

The correlation between disability scores (CHFS total score) and pain scores were fair, when considering global assessment of pain in the right hand (which was the dominant hand for more than 95% of the patients), and the correlation coefficients were close between the two groups (0.653 and 0.617 for BT and IP, respectively) (Table V). This was also the case for the correlation coefficients between disability and handicap (0.486 and 0.469 for BT and IP, respectively). As expected, the correlation coefficients between disability and pain scores were high when considering the base of the thumb pain in the BT group and interphalangeal pain in the IP group. The main difference between the BT and IP groups were the disability and global tenderness scores (0.701 for IP and 0.403 for BT). As in other chronic joint diseases, disability was not correlated with radiological scores[5,13,14,17]. In both groups, one of the higher correlations was with grip strength of the dominant hand, suggesting that decrease in grip strength plays a role in disability in daily living activities.

Table II
*Clinical characteristics of the population**

	Whole group of patients (*N*=16)	BT group (*N*=67)	IP group (*N*=49)	BT vs IP *P* value Student's *t*-test of Chi^2
Disease duration (years) (mean±SD)	8.42±6.26	7.77±6.05	9.31±6.50	0.20
Treatments received (%)				
Analgesics	28.44	29.85	26.53	0.69
NSAID	23.27	31.34	12.24	0.02
NSAID topics	31.89	31.34	32.65	0.88
SAMD	43.10	38.80	48.98	0.27
Ortheses	54.31	64.18	40.81	0.01
Local infiltration	27.58	32.83	20.40	0.14
Pain (VAS) (mean±SD)				
Global (right hand)	35.32±28.66	35.94±29.77	34.49±27.36	0.79
Global (left hand)	31.51±27.34	29.54±28.37	34.19±25.91	0.36
Base of the thumb (right)	25.13±29.35	35.95±30.35	10.34±20.28	>0.01
Base of the thumb (left)	24.32±28.64	31.06±28.85	13.10±22.87	>0.01
IP (right)	22.46±27.16	12.62±21.18	35.91±28.82	>0.01
IP (left)	18.89±26.07	7.11±16.57	35.00±28.15	>0.01
Ritchie articular index (range 0–72) (mean±SD)	9.82±7.62	8.61±6.57	11.59±8.71	0.05
Kapandji index (mean±SD)				
Total score (range 0–100)	90.15±10.24	94.15±6.66	84.69±11.72	>0.01
Thumb score (range 0–20)	18.53±2.10	18.63±1.70	18.39±2.56	0.57
IP score (range 0–80)	71.63±9.65	75.52±6.06	66.31±11.06	0.00
Kallman's radiological index (mean±SD)				
Total score (range 0–220)	50.94±33.48	37.67±23.52	67.47±36.76	0.00
Thumb score (range 0–60)	13.23±7.47	14.08±6.32	12.16±8.65	0.20
IP score (range 0–160)	37.39±30.58	23.23±21.25	55.30±31.33	>0.01
Grip strength (Newton)				
Right hand	197.23±86.17	197.65±90.47	196.65±80.84	0.95
Left hand	186.71±76.13	190.55±76.56	181.45±76.00	0.53
Pinch strength (Newton)				
Right hand	31.00±12.57	30.16±12.45	32.14±12.77	0.41
Left hand	29.12±11.24	29.40±11.15	28.67±11.44	0.73
Cochin disability index (range 0–90) (mean±SD)	15.97±13.25	16.84±12.60	14.80±14.13	0.42
Handicap (VAS) (mean±SD)	38.48±29.66	38.66±29.95	38.24±29.60	0.94

*Abbreviations: BT: base of the thumb; IP: interphalangeal joint; SD: standard deviation; VAS: visual analog scale.

Analysis of the correlation between F1, F2, F3, and other outcomes measure scores did not highlight other differences between the IP and BT groups (Table IV).

Discussion

This is the first study comparing disability between clinical hand OA patients with more symptomatic BT or IP. The clinical impression that symptomatic BTOA is more disabling than symptomatic IPOA is not supported by our results.

Use of the CHFS total score revealed no significant differences between the BT and IP groups according to the level of disability. Factor analysis of the CHFS in the whole group of patients extracted three factors (F1, F2, F3). F1 and F3 scores did not differ in the BT and IP groups. However, F2 scores were significantly higher in the BT group. This factor mainly contains activities mostly requiring grip strength. This observation suggests that grip strength plays a more important role in disability in the BT group than in the IP group. However, when factor analysis of the CHFS was performed in each group (BT and IP), there was a lack of difference in the type of disability. In fact, the first extracted factor for each group contained almost the same items (six of eight items for BT and six of seven for IP groups were shared) and explained a comparable amount of total variance (48.54% and 56.96% for the BT and IP groups, respectively). Moreover, this first factor for the BT and IP groups mainly corresponded to the second factor (F2) extracted in the whole group (six of eight items of F1 for BT and six of seven items of F1 for IP were shared with the seven items of F2 for the whole group). The second extracted factor for the BT group corresponds to the third factor for the IP group (three of five items for BT and three of four for IP groups were shared) and represents activities mainly requiring pinch strength. This result suggests that grip strength accounts for a little more disability in patients with symptomatic BTOA than in those with IPOA, although there is no difference in pinch strength between the groups. Finally, patients' perceived handicap did not differ between the groups. This result reinforces the idea that clinical BTOA and IPOA consequences in patients' lives can be considered similar.

A greater number of patients in the BT group than in the IP group received antiinflammatory drugs, and more of the former used orthoses. This observation could mean that despite a lack of difference in VAS pain results between the groups, the BT group experienced more pain needing more aggressive treatment, the absence of difference in pain levels between the two groups being the result of treatment. In this case, if pain assessment is the main outcome measure in a clinical trial in hand OA, both groups should be analyzed separately. Another explanation could be that doctors believe that symptomatic BTOA is a more painful and disabling entity and prescribe accordingly. Concerning

Table III
Factors in factor analysis and Varimax rotated factor matrix of the Cochin functional scale in the whole group of patients (N=116), in the BT group (N=67), and in the IP group (N=49). The highest loading of each item is in italic *

	Whole group of patients			BT group			IP group		
	F1	F2	F3	F1	F2	F3	F1	F2	F3
Factors in factor analysis									
Eigenvalue	9.17	1.48	1.11	8.74	1.58	1.12	10.25	1.54	1.01
% variance	51.00	8.21	6.15	48.54	8.78	6.20	56.96	8.56	5.61
Cumulative%	51	59.21	65.36	48.54	57.32	63.52	56.96	65.52	71.17
Varimax rotated factor matrix									
1	0.272	*0.700*	0.253	*0.738*	0.211	0.223	*0.655*	0.264	0.317
2	0.135	*0.875*	0.154	*0.848*	0.035	0.141	*0.863*	0.190	0.246
3	3.306	*0.742*	0.232	*0.745*	0.252	0.262	*0.576*	0.195	0.563
4	0.092	*0.805*	0.386	*0.786*	0.072	0.415	*0.792*	0.334	0.124
5	0.294	*0.722*	0.102	*0.673*	0.291	0.162	*0.817*	0.144	0.141
6	*0.627*	0.361	0.312	0.272	*0.554*	0.464	*0.615*	0.303	0.512
7	*0.599*	0.116	0.430	0.040	*0.574*	0.415	0.449	*0.582*	0.334
8	0.493	*0.514*	0.347	*0.497*	0.395	0.364	*0.602*	0.456	0.409
9	*0.692*	0.266	0.267	0.422	*0.628*	0.077	0.254	0.403	*0.700*
10	*0.802*	0.193	0.04	0.148	*0.840*	0.111	0.471	0.139	*0.507*
11	*0.639*	0.300	0.366	0.302	*0.686*	0.437	0.190	0.224	*0.833*
12	0.527	0.088	*0.590*	0.133	0.528	*0.629*	0.059	*0.613*	0.529
13	0.174	0.194	*0.839*	0.324	0.031	*0.799*	0.212	*0.883*	0.205
14	0.144	0.347	*0.794*	0.397	0.131	*0.747*	0.218	*0.864*	0.201
15	0.308	0.472	*0.549*	*0.513*	0.406	0.473	0.408	*0.661*	0.170
16	0.276	0.426	*0.548*	*0.621*	0.270	0.248	0.243	*0.633*	0.444
17	0.458	0.252	*0.472*	0.384	0.271	*0.399*	0.480	*0.486*	0.407
18	0.391	*0.523*	0.446	0.480	0.337	*0.490*	0.414	0.393	*0.701*

*Abbreviations: BT: base of the thumb; IP: interphalangeal joint; F1: factor 1; F2: factor 2; F3: factor 3.

Table IV
*Disability analysis in the whole group of patients (N=116), in the BT group (N=67) and in the IP) group (N=49)**

	Whole group of patients (*N*=116)	BT group (*N*=67)	IP group (*N*=49)	BT vs IP *P* value Student's *t*-test
Cochin disability index (range 0–99) (mean±SD)	15.97±13.25	16.84±12.60	14.80±14.13	0.42
F1 (range 0–25) (mean±SD)	2.78±3.48	2.48±3.15	3.18±3.89	0.30
F2 (range 0–35) (mean±SD)	7.85±6.25	9.04±6.13	6.22±6.09	0.02
F3 (range 0–30) (mean±SD)	5.34±4.87	5.31±4.59	5.39±5.28	0.94

*Abbreviations: BT: base of the thumb; IP: interphalangeal joint; SD: standard deviation; F1: first factor after factor analysis performed on the whole group of patients; F2: second factor after analysis performed on the whole group of patients; F3: third factor after analysis performed on the whole group of patients.

orthoses, it could be that this kind of treatment is more popular among clinicians for patients with BTOA than for those with IPOA. No randomized control trial aimed at assessing orthoses in OA of the hand is currently available.

The significant differences observed between the two groups for joint mobility assessed by the modified Kapandji index, joint radiological lesions assessed by Kallman's radiological index, and joint tenderness assessed by Ritchie's index are not surprising because of the over-representation of IP when compared to BT in the scoring of these indexes (interphalangeal joint assessments represent 80%, 73%, and 80% of the total scores for the Kapandji, Kallman, and Ritchie indexes, respectively)[21,24,27]. As expected, our radiographic data indicate that there is a radiological overlap between the two groups.

Pinch and grip strength did not differ between the groups. This observation could be considered surprising because it is usually accepted that pain located at the base of the thumb induces decreased pinch strength. This observation may be due to the level of pain measured in this study not being sufficient to induce decreased pinch strength. A control group without OA of the hand is needed to verify this hypothesis. Another hypothesis is that pinch strength is decreased in both groups for different reasons: in the BT group, less grip strength could be explained by pain frequently reported by patients during the assessment; in the IP group, the lower grip strength could be explained by pain, joint instability and deviation in interphalangeal joints of the second digit. Finally, pinch and grip strength and radiological scores were not correlated in the whole sample of patients as well as in both groups (*r* values between 0.06 and 0.24).

One possible limitation of this study could be the criteria used to include patients in the BT or IP groups. The classification was based on patients' opinion of the main location of pain and disability. However, patient's opinion can be considered an external standard[29]; only three patients were not included in the study because the main location of pain and disability was at different sites (interphalangeal joints and base of thumb), and the pain level at both locations were significantly different in the two groups of patients. Another limitation of the study is that we only selected symptomatic subjects and our results may not be

Table V
*Correlation (absolute value) between Cochin hand disability scores and age, impairment and handicap scores in the whole group of patients (N=116), in the BT group (N=67), and in the IP group (N=49)**

Variables	Whole group of patients				BT group				IP group			
	Total	F1	F2	F3	Total	F1	F2	F3	Total	F1	F2	F3
Age	0.017	0.042	0.101	0.034	0.086	0.089	0.041	0.056	0.119	0.020	0.151	0.012
Pain (VAS)												
Global (right hand)	0.641	0.527	0.570	0.669	0.653	0.561	0.625	0.671	0.617	0.518	0.548	0.643
Global (left hand)	0.338	0.300	0.290	0.297	0.338	0.343	0.409	0.395	0.237	0.225	0.199	0.144
Base of the thumb (right)	0.393	0.260	0.485	0.428	0.393	0.464	0.631	0.651	0.247	0.184	0.248	0.337
Base of the thumb (left)	0.334	0.224	0.400	0.295	0.334	0.305	0.403	0.361	0.245	0.265	0.290	0.329
IP (right)	0.362	0.348	0.224	0.374	0.362	0.337	0.267	0.312	0.571	0.482	0.567	0.602
IP (left)	0.123	0.204	0.027	0.176	0.123	0.202	0.206	0.277	0.170	0.195	0.142	0.097
Ritchie articular index	0.530	0.526	0.463	0.543	0.403	0.433	0.451	0.416	0.708	0.634	0.619	0.728
Kapandji index	0.288	0.290	0.196	0.356	0.291	0.246	0.248	0.325	0.460	0.331	0.446	0.522
Kallman's radiological index												
Total score	0.199	0.255	0.082	0.242	0.162	0.123	0.067	0.192	0.347	0.340	0.353	0.386
Thumb score	0.072	0.068	0.146	0.155	0.009	0.062	0.055	0.061	0.115	0.195	0.202	0.269
IP score	0.177	0.253	0.042	0.239	0.129	0.133	0.058	0.184	0.342	0.330	0.329	0.363
Grip strength (Newton)												
Right hand	0.420	0.369	0.453	0.421	0.420	0.461	0.541	0.415	0.369	0.277	0.345	0.401
Left hand	0.363	0.359	0.398	0.392	0.363	0.397	0.447	0.364	0.380	0.290	0.354	0.407
Pinch strength (Newton)												
Right hand	0.310	0.242	0.310	0.308	0.310	0.226	0.282	0.184	0.360	0.270	0.300	0.418
Left hand	0.298	0.266	0.302	0.319	0.298	0.274	0.402	0.269	0.328	0.303	0.205	0.394
Handicap (VAS)	0.489	0.428	0.440	0.514	0.486	0.479	0.443	0.554	0.469	0.364	0.452	0.441

*Abbreviations: BT: base of the thumb; IP: interphalangeal joint; SD: standard deviation; F1: score of the first factor in factor analysis performed on the whole group of patients; F2: score of the second factor in analysis performed on the whole group of patients; F3: score of the third factor in analysis performed on the whole group of patients.

valid in a population with radiographic hand OA without hand symptoms. However, only symptomatic patients are recruited in clinical trials.

Using the same outcome measures, the authors of this study have previously observed that patients with RA had a slightly higher level of pain (VAS pain, 49.80±29.68) but a comparable level of disability (CHFS, 17.17±15.00) and perceived handicap (VAS handicap, 35.91±25.95) than patients with OA of the hand (38.33±22.41, 16.39±13.49, and 36.43±21.99 for VAS pain, CHFS and VAS handicap scores, respectively)[5,13,14]. These results are confirmed by this study and suggest that OA of the hand (BT and/or IP) is for some people as cumbersome as RA and should be considered as such by clinicians.

In conclusion, disability and perceived handicap levels are comparable between clinical hand OA patients with more severe location at BT and IP. These two groups should not be analyzed separately in trials assessing treatments for hand OA as long as disability or handicap assessments are the main outcome measures. Osteoarthritis of the hand (BT and/or IP) appears to have similar consequences to RA in terms of disability of the hand and handicap, and should be given similar attention by clinicians and research groups.

Acknowledgements

The authors are most grateful to Jacques Rodineau (Physical Medicine and Rehabilitation, Pitié-Salpêtrière Hospital), Caroline Leclerq (Hand Surgery, Institut de la Main), Maxime Dougados and André Kahan (Rheumatology Department, Cochin Hospital), Thomas Bardin and Philippe Orcel (Rheumatology Department, Lariboisière Hospital) for recruitment of patients. The authors wish to thank Catherine Bedin, Franck Chagny and Brigitte Bernabé (occupational therapists, Cochin Hospital, Lariboisière Hospital), Élizabeth Vinard (medical secretary, Cochin Hospital) for their help.

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